causes a change in length, which can be controlled by the magnetic field. Most ferromagnetic materials such as iron, nickel, cobalt, gadolinium, alloys thereof, and the like exhibit some measurable magnetostriction. Exemplary magnetostrictive materials are alloys of iron, dysprosium, and terbium.

[0051] While the disclosure has been described with reference to an exemplary embodiment, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from the essential scope thereof. Therefore, it is intended that the disclosure not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this disclosure, but that the disclosure will include all embodiments falling within the scope of the appended claims.

1. An active seal assembly for sound isolation, comprising:

a flexible hollow body comprising an interior wall defining a first chamber and a second chamber;

a sensor disposed in an exterior wall of the body and in operative communication with a controller, wherein the sensor is adapted to detect an amplitude and a phase of a noise vibration and forward a signal corresponding to the amplitude and the phase to the controller; and

an active material disposed within the interior wall and in operative communication with the controller, wherein the active material is adapted to cancel the signal corresponding to the amplitude and the phase in response to an activation signal from the controller.

2. The active seal assembly of claim 1, wherein the active material comprises an electroactive polymer, an ionic polymer metal composite, a piezoelectric polymer or ceramic, a magnetostrictive material, a thin film shape memory alloy, and combinations comprising at least one of the foregoing active materials.

3. The active seal assembly of claim 1, wherein the sensor and the active material are distributed along the length of the flexible hollow body.

4. The active seal assembly of claim 1, wherein the sensor comprises a piezoelectric polymer or ceramic.

5. The active seal assembly of claim 1, wherein the active material is adapted to generate anti-noise in response to the signal.

6. The active seal assembly of claim 1, wherein the controller is disposed in a base portion of the body.

7. The active seal assembly of claim 1, further comprising a dissipative circuit in operative communication with the active material, wherein the active material is selected to couple electrical or magnetic energy to the dissipative circuit.

8. The active seal assembly of claim 1, wherein the active material is selected to provide passive damping of incident sound and vibrational energy via internal elastic losses.

9. An active seal assembly for sound isolation, comprising:

a flexible hollow body comprising an interior wall defining a first chamber and a second chamber;

a normal force sensor disposed in an exterior wall of the body and in operative communication with a controller, wherein the normal force sensor is adapted to detect planar waves and forward a signal to the controller, wherein the controller is adapted to average the amplitudes and frequencies associated with planar waves; and

an active material disposed within the interior wall and in operative communication with the controller, wherein the active material is adapted to absorb the planar waves in response to an activation signal from the controller.

10. The active seal assembly of claim 9, wherein the active material is an electrorheological fluid, a magnetorheological fluid, and combinations comprising at least one on the foregoing active materials.

11. The active seal assembly of claim 9, wherein the controller averages an amplitude and frequency of the planar waves to provide the activation signal.

12. An active seal assembly for sound isolation, comprising:

a flexible hollow body defining an interior wall region;

a shear force sensor disposed in an exterior wall of the body and in operative communication with a controller, wherein the shear force sensor is adapted to detect a noise vibration and forward a signal to the controller; and

a plurality of planar membranes comprising an active material in operative communication with the controller, wherein the plurality of planar membranes are disposed in the interior wall region and are generally parallel to a base portion of the flexible hollow body, wherein the active material is adapted to cancel the signal in response to an activation signal from the controller.

13. The active seal assembly of claim 12, wherein the active material is adapted to cancel shear waves.

14. The active seal assembly of claim 12, wherein the active material is a magnetorheological elastomer, thin film shape memory alloys, piezoelectric ceramic or polymers, electroactive polymers, and, and combinations comprising at least one on the foregoing active materials.

15. The active seal assembly of claim 12, wherein the controller averages an amplitude and frequency of the planar waves to provide the activation signal.

16. An active seal assembly for sound isolation, comprising:

a flexible hollow body defining an interior wall region;

a shear force sensor disposed in an exterior wall of the body and in operative communication with a controller, wherein the shear force sensor is adapted to detect a noise vibration and forward a signal to the controller; and

a plurality of planar membranes disposed in the interior wall region and are generally parallel to a base portion of the flexible hollow body; and

an active material fluid intermediate each one of the plurality of planar membranes in operative communi-